Port Powered RS-232/485 Converters

4WSD9R, 4WSD9TB

PRODUCT FEATURES

- Extend RS-232 data signals up to 1.2 km (4,000 ft.)
- Change RS-232 TD and RD to RS-485 signals
- Automatic Send Data Control
- Baud rates up to 115.2 kbps
- RS-232 Port Power or External 12 VDC Power Jack
- Dipswitch selectable RS-422 or RS-485

The 4WSD9TB and 4WSD9R Universal Converter provides RS-232 to RS-422/RS-485 conversion using either port-power or an external power supply. The 4WSD9TB has a Terminal Block RS-485 connector, and the 4WSD9R has a DB9 Female connector.

Data is converted in both directions, RS-232 Transmit data is converted to balance RS-422 or RS-485 Transmit, and Received RS-422/485 signals are converted to RS-232. Unlike converters which require programing hardware handshaking signals to control RS-485 or RS-422 operation, the 4WSD9TB and 4WSD9R provides automatic Send Data Control. In RS-485 mode, the RS-485 driver is enabled by circuitry which senses the RS-232 TD input. In half duplex RS-485 mode, the receiver is enabled when not transmitting. For full duplex operation, the receiver is set always enabled. In RS-422 mode, the transmitter and receiver are always enabled. The operating mode is set with 4 switches (Table 1). The converters are powered by the RS-232 signal lines whether they are set high or low. If not enough power is available from the port, or no handshaking lines are available, a DC Jack is provided to connect a 12VDC supply. The DB9 female connector for RS-232 is wired as DCE (like a modem).

No external power is required if two RS-232 output handshake lines are available and the cable run is short. If the handshake lines are raised and no termination is used, the power efficiency is greatly increased. Less than 3mA is required to operate the 4WSD9R plus the load current. For applications that do not have handshake lines or require a large load current, power may be externally supplied with a +12VDC power supply with a 2.5mm plug (tip positive).

The RS-232 port has a female DB9 connector with pins 2 (RD), 3 (TD), and 5 (Signal Ground) supported. Pins 7 (RTS) and 8 (CTS) are tied together, and pins 6 (DSR), 1 (DCD), and 4 (DTR) are also tied together. Any incoming data lines in either the high or low state are used to port power the 4WSD9R. The more handshake lines available, the more likely the unit can be port powered. Table 2 shows the RS-232 pinout.

Although handshake lines can be used to power the converter, no handshaking is required to control the RS-422/RS-485 driver. With switch 1 set to RS-422, the driver is always enabled. When switch 1 is in the RS-485 position, the RS-485 driver is automatically enabled during each spacing state on the RS-232 side. During the marking or idle state, the RS-485 driver is disabled and the data lines are held in the marking state by the 4.7K Ohm pull-up and pull-down resistors. The value of these resistors may need to be changed to a different value when termination is used in order to maintain the proper DC bias during the idle state.

ORDERING INFORMATION

MODEL NUMBER	RS-232 CONNECTOR	RS-485 CONNECTOR	OUTPUT	OPTIONAL POWER SUPPLY
4WSD9R	DB9 Female	DB9 Female	RS-485 2 or 4-wire or RS-422	✔
4WSD9TB	DB9 Female	Terminal Block	RS-485 2 or 4-wire or RS-422	✔

ACCESSORIES

485PS - 12 VDC power supply, 100 mA, 2.5 mm plug, USA

E1250BL-BB3 - 220-240 VAC to 12 VDC wall power supply, 2.5 mm plug, Euro CEE7/7 plug

9PAMF6 - DB9 male to DB9 female adapter cable, 6 ft. (1.8 m)

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SPECIFICATIONS

SERIAL TECHNOLOGY	
Data Rate	115.2 kbps maximum
RS-232	
Connector	4WSD9R: DB9 female 4WSD9TB: DB9 female
Signals	RD, TD, GND, DCD, DTR, DSR, RTS, CTS
Port Power **	Pins 7 (RTS) and 8 (CTS) are tied together, and pins 6 (DSR), 1 (CD), and 4 (DTR) are also tied together.
RS-422/485	
Connector	4WSD9R: DB9 female 4WSD9TB: Terminal block
Biasing Resistors	4.7k Ohms
Signals	TDA (-), TDB (+), RDA (-), RDB (+), GND
Termination	None
Operation	Dipswitch selectable RS-422 or RS-485 4WSD9R: RS-485 2 or 4-wire or RS-422 4WSD9TB: RS-485 2 or 4-wire or RS-422

POWER	
Source	Port-powered: from RS-232 handshake lines. External 12-16 VDC power supply, optional.
**	Port-powered requires 7 to 12 VDC supplied on at least one handshake line.
Power Connector	2.5 mm plug (tip positive)
Input Voltage	12 VDC @ 100 mA

MECHANICAL	
Dimensions,	4WSD9R: 7.8 x 4.3 x 2.0 cm (3.0 x 1.6 x 0.8 in) 4WSD9TB: 9.0 x 4.3 x 2.3 cm (3.6 x 1.7 x 0.9 in)
Enclosure	Plastic, Inline
Weight	4WSD9R: 0.10 lbs. (49 g); 4WSD9TB: 0.11 lbs. (50 g)
MTBF	4WSD9R: 880179 4WSD9TB: 345242
MTBF Calc. Method	Parts Count Reliability Prediction

ENVIRONMENTAL	
Operating Temperature	0 to +70 °C (+32 to +158 °F)
Storage Temperature	-40 to +85 °C (-40 to +185 °F)
Operating Humidity	0 - 95% Non-condensing

APPROVALS / CERTIFICATIONS - 4WSD9R, 4WSD9TB

FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class A Emissions (4WSD9R)
FCC Part 15, CISPR, EN 55022: 2010 + AC:2011 Class B Emissions (4WSD9TB)
CE
EN 61000-6-1: 2007 Generic Standards for Residential, Commercial and Light-Industrial Environments
EN 61000-4-2: 2009 Electro-Static Discharge (ESD)
EN 61000-4-3: 2006 +A1 +A2 +IS1 Radiated Field Immunity (RFI)
EN 61000-4-4: 2012 Electrical Fast Transients-Burst Immunity (EFT)
EN 61000-4-6: 2009 Conducted Immunity
Download complete Declaration of Conformity at www.bb.elec.com